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Heintschel

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(54) **FOLDABLE HAND TOOL**

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CPC ***A46B 5/005*** (2013.01); ***A46B 5/0045*** (2013.01); *A46B 2200/302* (2013.01)

(58) **Field of Classification Search**
CPC A46B 5/005; A46B 5/0045; A46B 2200/302; B25G 3/00; B25G 3/36; B25G 3/38
USPC 15/111, 145, 146, 144.1, 172; 16/422, 16/900
See application file for complete search history.

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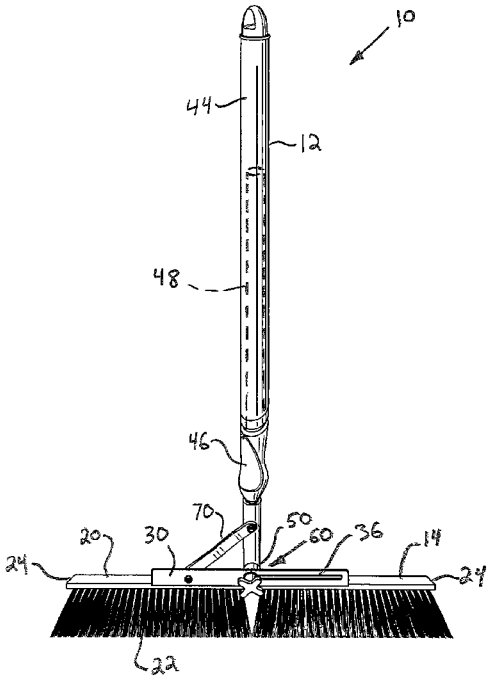
(57) **ABSTRACT**

A hand tool assembly, such as a push broom, includes an elongated work head defining a width and having a slot formed therein extending in a direction along the width. A handle includes an end portion slidably mounted in the slot such that the end portion is movable between a first position and a second position. A fastening mechanism releasably secures the end portion of the handle to the work head when the end portion is in the first position.

9 Claims, 2 Drawing Sheets



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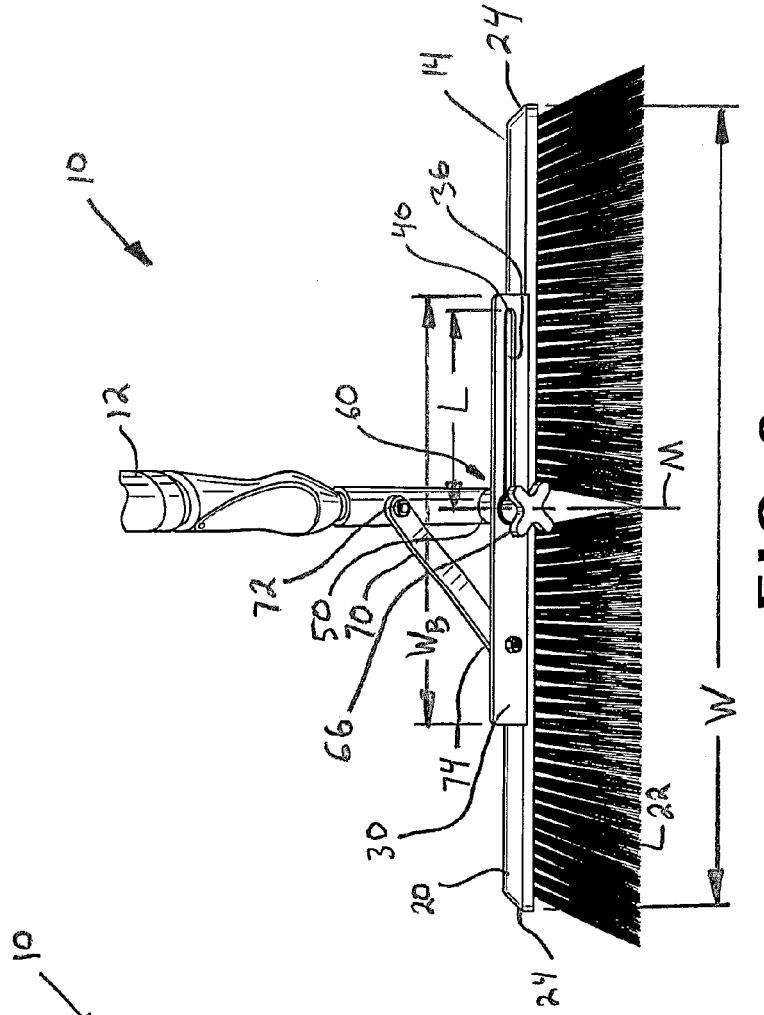
10
12
14
24
36
40
60
L
M
W
72
50
70
W_B
66
74
30
20
22

FIG. 2

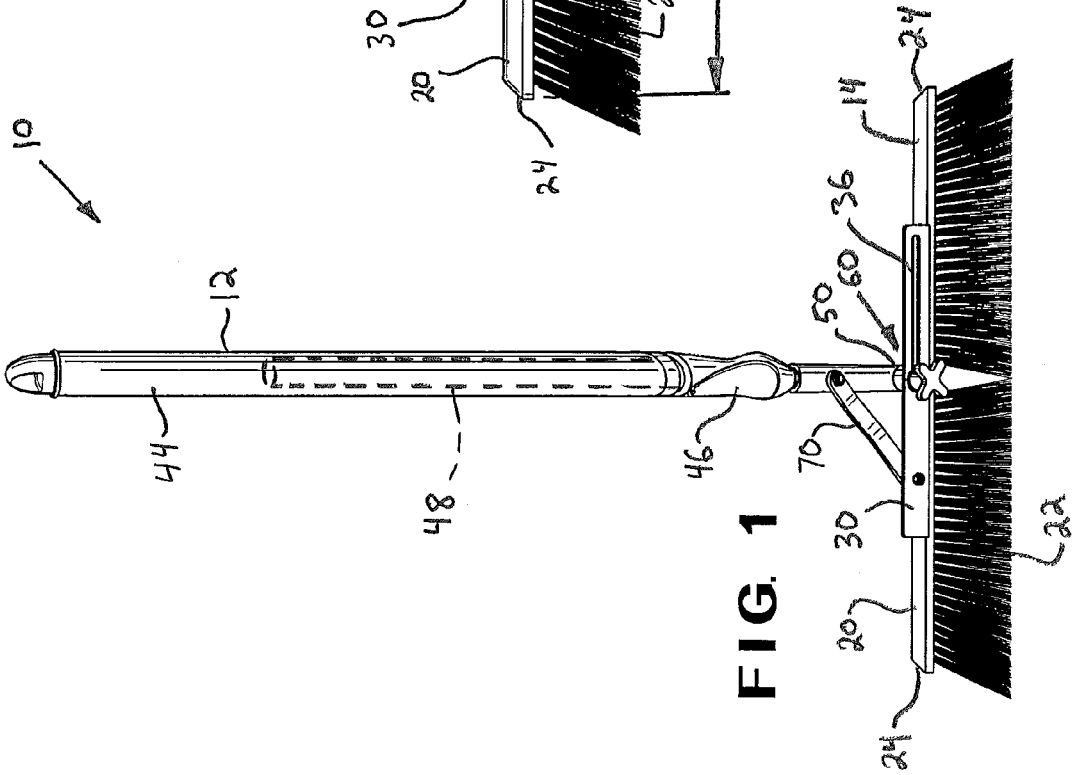
10
12
14
24
36
50
60
70
30
20
22
44
48
46

FIG. 1

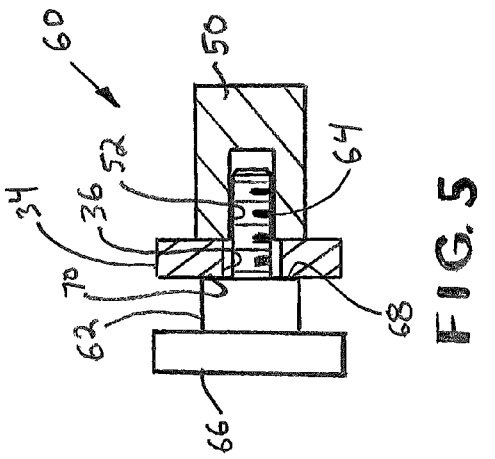

FIG. 5

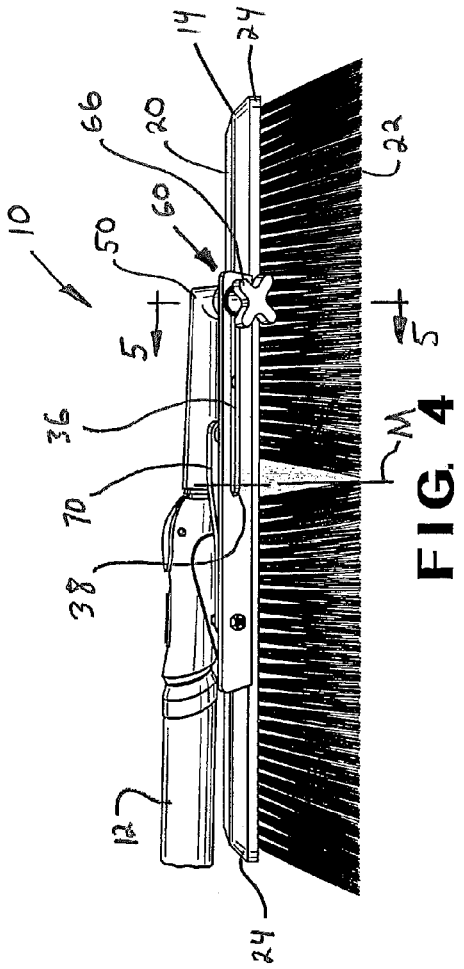

FIG. 4

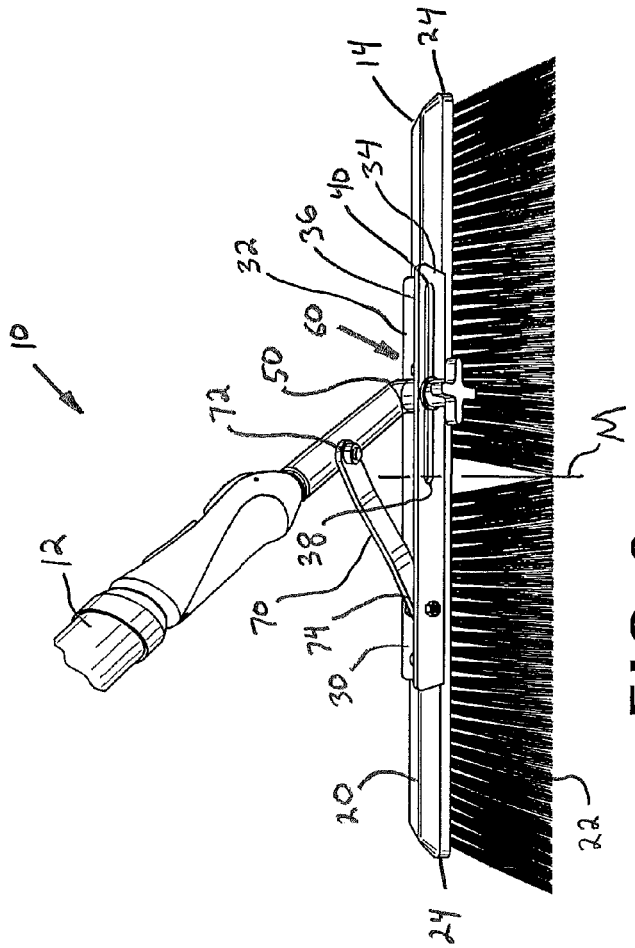

FIG. 3

FOLDABLE HAND TOOL

BACKGROUND OF THE INVENTION

This invention relates in general to manually operated hand tools, such as push brooms. Conventional push brooms typically include an elongated rigid work head having a plurality of coarse stiff bristles extending from the bottom of the work head. A handle is attached to the work head which generally extends at a right angle from the elongated work head. Although the handle is generally connected to the work head at a central or mid-point of the work head, some brooms have handles which are pivotally mounted at a point which is offset from the mid-point. Typically, the handle includes a threaded end portion which is threadably attached to the work head. This connection provides a fixed attachment which may be unscrewed to replace the handle or work head. Alternatively, the handle may be unscrewed from the work head so that the separated handle and broom may be positioned together in a parallel arrangement and stored in a more efficient manner than when attached to one another. However, this arrangement has the disadvantage of having to reassemble the broom assembly for every use and possibly misplacing or losing one of parts. To prevent this, some brooms include handles having end portions which are pivotally attached to the work head so that they can be pivoted between a use position and storage position such that the handle and work head are parallel with one another and still attached to one another. However, this arrangement provides for a relatively long overall length when the broom is pivoted to its storage position.

SUMMARY OF THE INVENTION

This invention relates to a hand tool assembly, such as a push broom, including an elongated work head defining a width and having a slot formed therein extending in a direction along the width. A handle includes an end portion slidably mounted in the slot such that the end portion is movable between a first position and a second position. A fastening mechanism releasably secures the end portion of the handle to the work head when the end portion is in the first position.

In another embodiment, the invention relates to a handle attachment assembly for a hand tool including an elongated bracket defining a width and having a slot formed therein extending in a direction along the width. The bracket is configured for attachment to a hand tool. A handle includes an end portion slidably mounted in the slot such that the end portion is movable between a first position and a second position. A fastening mechanism releasably secures the end portion of the handle to the work head when the end portion is in the first position.

In yet another embodiment, the invention relates to a hand tool assembly including an elongated work head defining a width and a mid-point generally equidistant from ends of the work head. The work head includes a first attachment point adjacent the mid-point, and a second attachment point spaced from the mid-point. A handle includes an end portion. A brace has a first end pivotally attached to the handle, and a second end pivotally attached to the work head. A fastening mechanism releasably secures the end portion of the handle to either the first attachment point or the second attachment point such that when the end portion of the handle is secured at the first attachment point, the handle is generally perpendicular to the work head, and wherein when the end portion of the handle is secured at the second attachment point, the handle is generally parallel to the work head.

Various aspects of this invention will become apparent to those skilled in the art from the following detailed description of the preferred embodiment, when read in light of the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a broom assembly.

FIG. **2** is an enlarged perspective view of the work head of the broom assembly of FIG. **1**, wherein the broom assembly is shown in a use position.

FIG. **3** is a perspective view of the broom assembly of FIG. **2**, wherein the broom assembly is shown in an intermediate position.

FIG. **4** is a perspective view of the broom assembly of FIG. **2**, wherein the broom assembly is shown in a storage position.

FIG. **5** is a cross-sectional view taken along lines **5-5** of FIG. **4**.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, there is illustrated in FIG. **1** a hand tool assembly in the form of a broom assembly, indicated generally at **10**. The broom assembly **10** includes a handle **12** and a work head **14**. As will be explained below, the handle **12** is movable between a use position, as shown in FIGS. **1** and **2**, and a storage position, as shown in FIG. **4**, relative to the work head **14**.

In the illustrated embodiment, the work head **14** includes a body **20** having a plurality of bristles **22** extending downwardly from the body **20**, thereby forming a push style broom. It should be understood that the work head **14** may be formed as other hand operated tools not including the bristles **22**. Examples of suitable arrangements for the work head **14** include configurations of squeegees, mops, rakes, hoes, shovels, and scrapers. Thus, it should be understood that the invention is not necessarily limited to a work head **14** having bristles **22**. The body **20** may be made of any suitable material such as wood, plastic, or metal.

As shown in FIG. **2**, the body **20** of the work head **14** is generally elongated and defines a width W having a mid-point, indicated by a transverse axis M in the figures. The mid-point M is located centrally between ends **24** of the body **20** such that the ends **24** are approximately equally spaced apart from the mid-point M. As will be discussed below, the handle **12** is attached to the body **20** at the mid-point M when in its use position which is usually ideal for operation of a push broom type hand tool.

The broom assembly **10** further includes an elongated bracket **30** which is fixedly attached to the body **20**. The bracket **30** may be made of any suitable material, such as metal, wood, or plastic. The elongated bracket **30** defines a width W_B. The bracket **30** is attached to the body **20** such that they are generally parallel to one another. As best shown in FIG. **3**, the illustrated bracket **30** has an L-shaped cross-section. The bracket **30** has a bottom portion **32** attached to the body **20**. A upper portion **34** extends upwardly away from the body **20**. The bottom portion **32** can be attached to the body **20** by any suitable manner such as by fasteners, adhesives, or welding. As best shown in FIG. **3**, the upper portion **34** includes a slot **36** formed therein having a first end **38** and a second end **40** and having a length L. The first end **38** of the slot **36** is generally positioned adjacent the mid-point M of the body. The second end **40** of the slot **36** is spaced apart from the mid-point M toward one of the ends **24** of the body **20**. Although the broom assembly **10**, as shown in FIGS. **1-4**,

includes a separate body **20** and bracket **30**, the bracket **30** may be formed integrally with the body **20** such that the body **20** is configured to include the slot **36**. Thus, a separate bracket **30** may be eliminated. The use of a separate bracket **30** may be useful for attaching the bracket **30** to a pre-manufactured work head **14** such that the broom assembly **10** may be sold as a kit without the work head **14** so that the buyer can attach the bracket **30** to any suitable work head sold separately.

As shown in FIG. **1**, the handle **12** of the broom assembly **10** is elongated and is held by the user during operation of the broom assembly **10**. The handle **12** can have any suitable shape, such as cylindrical or contoured. The handle **12** may have a fixed length or may be made of multiple sections that are preferably telescopically mounted to one another so that the overall length of the handle **12** can be reduced and collapsed for storage. For example, the handle **12** can include a first portion **44** and a second portion **46**. The second portion **46** may include an extension **48** which is telescopically mounted within the first portion **44**. Alternatively, the handle **12** may include three or more telescopically arranged portions to further reduce the overall length when collapsed.

Referring to FIGS. **4** and **5**, the handle **12** further includes an end portion **50**. The end portion **50** includes a threaded bore **52** formed therein. The broom assembly **10** includes a fastening mechanism in the form of a clamping mechanism, indicated generally at **60**. The clamping mechanism **60** includes a hand knob **62** having a threaded stud **64** received in the threaded bore **52** of the end portion **50** of the handle **12**. The threaded stud **64** extends through the slot **36** of the bracket **30** such that the bracket **30** is sandwiched between the knob **62** and the end portion **50** of the handle **12**. The knob **62** can include a handle portion **66** for assisting in turning the knob **62** by manual operation. The knob **62** includes a shoulder **68** which abuts a surface **70** of the upper portion **34** of the bracket **30**. Alternatively, the clamping mechanism **60** could be configured such that a threaded stud is mounted on the end portion **50** which engages with a threaded bore formed in the knob **62**. It should be understood that the illustrated clamping mechanism **60** is only one example of a suitable fastening mechanism and that any suitable fastener may be used to releasably secure the end portion **50** of the handle **12** to the bracket **30**.

The broom assembly **10** further includes a brace **70**. The brace **70** can be in the form or an elongated rod or link member and can be made of any suitable material, such as metal, plastic, or wood. The brace **70** includes a first end **72** pivotally attached to the handle **12** and a second end **74** pivotally attached to the bracket **30**.

The broom assembly **10** is shown in FIGS. **1** and **2** in its use position. In this position, the handle **12** is generally perpendicular to the of the work body **20**. The threaded stud **64** of the clamping mechanism **60** is positioned at the first end **38** of the slot **36** such that the end portion **50** of the handle **12** is aligned with the mid-point M of the body **20**. The brace **70** is sized so as to help support the handle **12** when in the use position. In the use position, the clamping mechanism **60** is in a clamped position such that the position of the end portion **50** of the handle **12** is fixed relative to the bracket **30**. In the clamped position, the knob **62** is rotated to squeeze or clamp the bracket **30** between the shoulder **68** of the knob **62** and the end portion **50** of the handle **12** such that frictional forces maintain this position. If desired, the clamping mechanism **60** may further include washers, Belleville springs, or bushings (not shown). Note that although the slot **36** could be made longer such that the first end **38** does not line up with the mid-point M of the body **20**, it is preferred to be positioned at the mid-point M so that the user of the broom assembly **10** can quickly position the end portion **50** of the handle **12** to this use position.

To place the broom assembly **10** in its storage position, the clamping mechanism **60** is first released to an unclamped position. To accomplish this, the knob **62** is rotated in the opposite direction such that the stud **64** is moved slightly in an axial direction out from the threaded bore **52**, thereby releasing the frictional grip between the shoulder **68**, the bracket **30**, and the end portion **50**. The end portion **50** of the handle **12** can then be moved towards the end of the bracket **30** such that the threaded stud **64** slides within slot **36** from the first end **38** toward the second end **40**. FIG. **3** illustrates this intermediate position when the broom assembly **10** is between its use and storage position. Sliding the end portion **50** and the threaded stud **64** a sufficient distance toward the second end **40** of the slot **36**, as shown in FIG. **4**, will place the broom assembly **10** in its storage position such that the handle **12** is generally parallel with the body **20**. If desired, the clamping mechanism **60** may then be engaged to its clamped position to secure the handle **12** in this parallel storage position. During movement between the use and storage positions, the brace **70** assists in sliding the end portion **50** towards or away from the mid-point M. Note that the brace **70** may be eliminated such that the clamping mechanism **60** is operated once the handle **12** is manually aligned in the perpendicular arrangement relative to the body **20**.

The advantage of the configuration of the broom assembly **10** is that when the broom assembly **10** is placed in the storage position, the end portion **50** of the handle **12** is moved away from the mid-point M of the work head **14** so that the overall folded length of the handle **12** and the work heads **14** is reduced compared to a conventional foldable broom assembly. In a conventional foldable broom assembly, the end of the handle is pivotally fixed at the mid-point of the body of the work head and the handle is simply pivoted to a parallel position with the body. If desired, the width W_B of the bracket **30** and the slot **36** can be increased to further reduce the length of the folded broom assembly **10** in its storage position. Note that if the slot **36** was configured to extend between the mid-point M and a position adjacent the end **24** of the body **20**, the reduced overall folded length of the broom assembly **10** would be optimized but may require additional material and added weight to the broom assembly **10**.

Another advantage of the configuration of the broom assembly **10** is that the handle **12** may be secured by the clamping mechanism **60** to position the handle **12** at any angle relative to the body **20**, such as shown in FIG. **3**. Positioning the broom assembly **10** in any of these intermediate positions may be useful, for example, for using the work head **14** against a vertical wall in which it is desired to orient the work head **12** in a vertical direction.

Although the slot **36** is shown and described as being continuous between the ends **38** and **40**, the bracket **30** could be configured such that the first and second ends **38** and **40** define separate holes functioning as two attachment points for the clamping mechanism **60**. In this configuration, the end portion **50** of the handle **12** and the threaded stud **64** of the knob **62** can be removed from one of the attachment points and positioned to the other attachment point to move the broom assembly between its use and storage positions. The clamping mechanism **60** can then be tightened in each position to secure the handle **12** to the work head **14**.

The principle and mode of operation of this invention have been explained and illustrated in its preferred embodiment. However, it must be understood that this invention may be

practiced otherwise than as specifically explained and illustrated without departing from its spirit or scope.

What is claimed is:

1. A hand tool assembly comprising:

a bracket adapted to support a work head and including first and second ends defining a mid-point that is generally equidistant from the first and second ends, the bracket having a slot including a first end that is positioned generally adjacent to the midpoint of the bracket and second end spaced apart from the mid-point;

a handle including an end portion that cooperates with the slot for sliding movement relative to the bracket;

a brace including a first end that is pivotally attached to the bracket and a second end that is pivotally attached to the handle such that the handle is movable relative to the bracket between a first position, wherein the bracket is generally perpendicular to the handle, and a second position, wherein the bracket is generally parallel to the handle; and

a fastening mechanism that selectively permits and prevents the bracket from moving relative to the handle.

2. The hand tool assembly defined in claim **1** further including a work head that is secured to the bracket.

3. The hand tool assembly defined in claim **2** wherein the work head is a broom.

4. The hand tool assembly defined in claim **1** further including a work head that is formed integrally with the bracket.

5. The hand tool assembly defined in claim **4** wherein the work head is a broom.

6. The hand tool assembly defined in claim **1** wherein the end portion of the handle is positioned generally adjacent to the first end of the slot when the bracket is located in the first position relative to the handle.

7. The hand tool assembly defined in claim **6** wherein the end portion of the handle is positioned generally adjacent to the second end of the slot when the bracket is located in the second position relative to the handle.

8. The hand tool assembly defined in claim **1** wherein the fastening mechanism selectively causes frictional engagement of the bracket and the handle to prevent the bracket from moving relative to the handle.

9. The hand tool assembly defined in claim **1** wherein the fastening mechanism includes a knob having a threaded stud that is received in a threaded bore provided in the end portion of the handle.

* * * * *